of luggage or package, and automatically discriminate said plastic explosive object from [harmless] non-explosive plastic, or plastic-like [and other] objects that are present in said initially unidentified ensemble of objects based on said calculated value of said specific property, said automatic discrimination utilizing x-ray transmission data of rays passing through said item of luggage or package, and near but not through said plastic explosive object to remove by computer calculation the contribution of unwanted overlying and underlying material of said ensemble of objects from the calculated value of said specific property of said plastic explosive object, and

said computer programmed to automatically indicate, based on said discrimination, presence of said plastic explosive object while said item of package or luggage progresses on said conveyor.

26 87. (Amended) A device for detecting specific material of interest [plastic explosive objects in packages or luggage which contain harmless plastic, plastic-like or other] in an ensemble of objects, comprising:

a conveyor for sequentially moving an ensemble of objects [said packages or luggage] through an inspection region,

a stationary X-ray source, located near said inspection region and positioned to expose sequentially said ensemble of objects, [packages or luggage in said inspection region to a flux of X-ray radiation of at least two substantially different energies,]

stationary X-ray detectors positioned to detect X-ray radiation transmitted through an item of said ensemble of objects [luggage or package], said detectors providing data corresponding to the intensity of transmitted radiation, and said detectors also providing detector outputs representing "no X-ray flux" data taken repeatedly when no X-ray radiation is arriving at said detectors after said X-ray exposure of said item, said "no X-ray flux" data also including a decay signal induced by said X-ray

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flux [taken repeatedly during exposure of said luggage or package], and

a computer operatively connected to said detectors to receive from each said detector both said X-ray data and said "no X-ray flux" data, said computer programmed to correct, for each detector, said X-ray data by eliminating contribution of said "no X-ray flux" data to said X-ray data and to determine, from said corrected X-ray data, the presence of said specific material of interest [plastic explosive object] while said ensemble of objects [item of luggage or package] progresses on said conveyor.

27 83. (Amended) The device of claim 26 [81] further comprising an X-ray controller operatively connected to said X-ray source and arranged to control timed emissions of X-ray pulses from said X-ray source at a high energy band and at a low energy band, said X-ray detectors being constructed and arranged to detect separately said X-ray pulses of said high energy band and said low energy band, said detectors being also constructed to take [taking] said "no X-ray flux" data [between emission of] separately after said high energy and low energy X-ray pulses.

28 84. (Amended) The device of claim 27 wherein said "no X-ray flux" data are collected immediately after [for] each said X-ray pulse.

31 87. (Amended) The device of claim 30 wherein said computer eliminates said contribution of said "no X-ray flux" data to said X-ray data by subtracting said "no X-ray flux" data from said X-ray data.

32 88. (Amended) The device of claim 27 or 30 wherein said computer calculates a value of a specific property of said specific material of interest [a plastic explosive object in said item of luggage or package], and automatically discriminate said specific material of interest from [plastic explosive object from harmless plastic, plastic-like and other] said ensemble of

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objects that are present based on said calculated value of said specific property, <u>said automatic discrimination</u> utilizing x-ray transmission data of rays passing through said <u>ensemble of objects</u> [item of luggage or package], and near but not through said <u>specific material of interest</u> [plastic explosive object] to remove by computer calculation the contribution of unwanted overlying and underlying material from the calculated value of said specific property of said <u>specific material of interest</u> [plastic explosive object], and

said computer also programmed to automatically indicate, based on said discrimination, presence of said <u>specific material of interest</u> [plastic explosive object] while said <u>ensemble of objects</u> [item of luggage or package] progresses on said conveyor.

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~~89~~. (Amended) The device of claim ~~88~~ **32** wherein the calculation of said specific property of said <u>specific material of interest</u> [plastic explosive object] includes the function of effectively combining data from many different rays that pass through said <u>specific material of interest</u> [plastic explosive object].

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~~90~~. (Amended) The device of claim ~~82~~ **26**, ~~85~~ **27** or ~~86~~ **30** wherein <u>said specific material of interest includes a plastic explosive</u> [said X-ray source and said X-ray detectors further arranged to provide information relevant to three dimensional spatial configuration of objects in said item of luggage or package].

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~~91~~. (Amended) A device for detecting specific material of interest in an <u>initially unidentified</u> ensemble of objects, comprising:

a conveyor for sequentially moving an ensemble of objects through an inspection region,

a stationary X-ray exposure system located at said inspection region and positioned to expose sequentially said <u>initially unidentified</u> ensemble of objects in said inspection

region to X-ray radiation of at least two substantially different energies,

a stationary X-ray detection system positioned to detect X-ray radiation transmitted through said ensemble of objects, said detection system providing data corresponding to the intensity of transmitted radiation of said two energies,

a computer operatively connected to said detection system to receive said data and programmed to calculate a value of a specific property of said specific material of interest in said ensemble of objects, and automatically discriminate said specific material of interest from other objects that are present based on said calculated value of said specific property, said automatic discrimination utilizing x-ray transmission data of rays passing through said unidentified ensemble of objects, and near but not through said specific material of interest to remove by computer calculation the contribution of unwanted overlying and underlying material of said ensemble of objects from the calculated value of said specific property of said specific material of interest, and

said computer programmed to automatically indicate, based on said discrimination, presence of said specific material of interest while said ensemble of objects progresses on said conveyor.

93. (Amended) The device of claim 91 or 92 wherein said specific material of interest is one of the following: [plastic explosives, other] explosives, drugs, and money.

94. (Amended) A system for detecting a specific material of interest within a package or suitcase comprising:

a conveyor for sequentially moving a package or suitcase

an X-ray inspection unit constructed to acquire X-ray transmission data of said package or suitcase and indicate from said transmission data a suspect package or suitcase that warrants further detailed inspection by CT scanning,

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said conveyor further moving said suspect package or suitcase to a CT scanner, and

said [a] CT scanner constructed to CT scan [for CT scanning] said suspect package or suitcase [of said package] to detect presence of said specific material of interest.

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102. (Amended) A system for detecting a specific material of interest within a package or suitcase [luggage] comprising:

a stationary X-ray source system and a stationary X-ray detection system, both connected to a computer, constructed to acquire [in a] dual energy X-ray transmission data of said package or suitcase and indicate therefrom suspect regions of a suspect package or suitcase that warrants further detailed inspection [by CT scanning], and

said X-ray source system and said X-ray detection system constructed and arranged to provide further information relevant to a physical property of an examined material in three dimensions in said suspect regions of [three dimensional spatial configuration of materials in said luggage or] said suspect package or suitcase.

103. (Amended) The system of claim 102 wherein said X-ray source and said X-ray detector [, operating in said fixed arrangement,] are further constructed and arranged to operate in a CT scanning mode to provide said information about said physical property in three dimensions [identify suspect slices of said suspect package or suitcase and then said X-ray source and said X-ray detector, operating in said CT scanning mode, examine only said identified suspect slices].

104. (Amended) The system of claim 94 [or 102] wherein said X-ray inspection unit employs a computer programmed to process said X-ray transmission data to calculate a value of a physical property of an examined material present in said package or suitcase by substantially removing contribution of unwanted

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underlying or overlying material to said determined value of said physical property, and then compare said calculated value of said physical property to a known value of said physical property of the specific material of interest in order to identify said suspect slices.

105. (Amended) The system of claim 102 or 104 wherein said physical property is <u>attenuation</u> [the atomic number Z].

108. (Amended) The system of claim 106 [or 107] wherein said specific property is a physical property of said specific material of interest.

110. (Amended) The system of claim 104 [and 106] further including a visual display that images location and shape of said specific material of interest by highlighting edges corresponding to detected edges of said specific material along with adjacent areas having similar characteristics to fill in along the detected edges.

112. (Amended) A method of detecting specific material of interest in an <u>initially unidentified</u> ensemble of objects, comprising:

    providing a stationary X-ray exposure system, a stationary X-ray detection system, and a computer operatively connected to said detection system,

    moving sequentially on a conveyor an <u>initially unidentified</u> ensemble of objects through an inspection region,

    exposing, at said inspection region, said ensemble of objects to X-ray radiation of at least two substantially different energies,

    detecting X-ray radiation transmitted through said ensemble of objects, and providing to said computer X-ray data corresponding to the intensity of transmitted radiation of said two energies,

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calculating a value of a specific property of a specific material of interest in said ensemble of objects, and automatically discriminating said specific material of interest from other objects that are present based on the calculated value of said specific property,

in said automatic discrimination utilizing x-ray transmission data of rays passing through said initially unidentified ensemble of objects, and near but not through said specific material of interest to remove by computer calculation the contribution of unwanted overlying and underlying material of said ensemble of objects from the calculated value of said specific property of said specific material of interest, and

automatically indicating, based on said discrimination, presence of said specific material of interest while said ensemble of objects progresses on said conveyor.

114. (Amended) The method of claim 112 or 113 wherein said specific material of interest is one of the following: [plastic explosives, other] explosives, drugs, and money.

116. (Amended) A method of detecting specific material of interest [plastic explosive objects in packages or luggage which contain harmless plastic, plastic-like or other] in an ensemble of objects, comprising:

providing a stationary X-ray source, stationary X-ray detectors, and a computer operatively connected to said detector,

moving sequentially on a conveyor an ensemble of objects through an inspection region,

exposing, at said inspection region, said ensemble of objects to a flux X-ray radiation of at least two substantially different energies,

detecting X-ray radiation transmitted through said ensemble of objects, and providing to said computer X-ray data corresponding to the intensity of transmitted radiation of said two energies,

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providing <u>repeatedly</u> to said computer detector outputs representing "no X-ray flux" data taken when no X-ray radiation is arriving at said detectors <u>after the X-ray exposure of said ensemble of objects</u>, said "no X-ray flux" data <u>also including a decay signal induced by said X-ray flux</u> [taken repeatedly during the exposure of said luggage or package],

correcting, for each detector, said X-ray data by eliminating contribution of said "no X-ray flux" data to said X-ray data, and

determining, from said corrected X-ray data, the presence of said <u>specific material of interest</u> [plastic explosive object] while said <u>ensemble of objects</u> [item of luggage or package] progresses on said conveyor.

~~117~~. (Amended) A method for detecting a specific material of interest within packages or luggage comprising the steps of:

moving sequentially on a conveyor packages or luggage,

acquiring X-ray transmission data of an item of luggage or package, using an X-ray inspection unit with a stationary X-ray source-detector <u>unit</u> [system], and indicating from said X-ray transmission data a suspect item of luggage or package that warrants further detailed inspection by CT scanning,

<u>moving on said conveyor said suspect item to a CT scanner,</u> and

CT scanning said suspect item of luggage or package to detect said specific material of interest.

~~118~~. (Amended) The method of claim ~~117~~ wherein <u>said stationary X-ray source-detector unit identifies a suspect region of said suspect item and</u> said CT scanning step provides information relevant to three dimensional spatial configuration of materials <u>in said suspect region</u> in said <u>suspect</u> luggage or package.